**IT Applications Unit 3, AOS 2, Organisations and Data Management**

**Structure and role of relational databases, p 101**

**Describe the following relationships in a relational database.**

1. One-to-one relationship

A one to one relation is used when a record in one table connected to only one record in the second table. For example, a passenger’s seat allocation on an aeroplane: One table would contain records about the passengers that will fly on the plane, and the other contains records of seats on a particular flight. Each seat on the plane can only hold one person, and each person can only sit in one seat.

1. One-to-many relationship

These indicate that one record in the first table can be connected to more than one in the second. Several workers in an office may have access to one phone, and all be given the same phone extension. Each extension record is therefore related to several employees.

1. Many-to-many relationship

When each record in the first table can be connected with a number of records in a second and similarly each record in the second may be related to more than one entry in the first. For example, at a shopping centre a customer may order a number of goods and is therefore related to a number of products, while each product may be ordered by more than one customer.

**Determining a RDBMS structure**

Need to determine which field in each database will be the primary key

1. What are the roles of foreign keys?

A foreign key is a tool that ensures that the data entered in one table will have corresponding values in another, effectively synchronising the tables to contain a complete data set.

**Read the document, Primary keys/ foreign keys**

1. Describe the characteristics of a foreign key.

A foreign key is a relationship that one table has with another. Each value in the record that is being used as the foreign key does not have to be unique (unlike the primary key), and there can be no corresponding value at all – one record may have no relationship with the second set of records.

What is meant by referential integrity?

Referential integrity is the concept that all the relationships between sets of data must remain consistent. When using a foreign key, the data must have a relationship with the second set of data in order for you to input that record into the foreign key. Referential Integrity involves the use of cascading update and cascading delete, which make automatic alteration to the sets of data if a value or record is changed, in order to maintain consistency.

**Table normalisation**

1. What is the role of table normalisation?

Table normalisation occurs after the breakdown of data into fields and tables. The rules of normalisation give the designer a way to insure that data integrity is maintained. The rules provide a systematic check for ways to make your tables more efficient, and ensure the fields are in the correct tables.

1. There are six “normal forms”, each rule applied successively from the first normal form, (1NF).
2. Describe the nature of the following three “normal forms”.
   1. First normal form, (1NF)

This rule states that at each field and record intersection (cell) there is only one value, not a list of values. For example, in a stock database, each product’s price field can only contain one price, not a list of several prices.

* 1. Second normal form, (2NF)

When you have more than one primary key in a table, each non key field must be fully dependant in the key, not just partly dependant. For example, a table containing the names of students, their subjects and their year level, the year level is only dependant on the student name key for integrity, and not on the subject field.

* 1. Third normal form, (3NF)

This rule specifies that every field in a table must relate directly to the primary key. For example, in a competition between several athletes: using the Event as the key, the Year and Winner’s name are both directly related to the key. The Winner’s date of birth, however, is not directly related to the Event. If a competitor wins several events, data error can occur if their date of birth is recorded differently each time.

**Read the article, normalisation for more explanation of this process.**